

Beryllium Research Needs

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Michael McCawley, Ph.D.
West Virginia University
Morgantown, WV 26506
mmccawley@hsc.wvu.edu
304-282-4470

Background

- Developed in 2001-2003
- 27 research needs prioritized/categorized
- Objective – guide potential funding requests
- Results – over 75% (20/27) of items addressed to some extent in peer reviewed literature
- New/Updated list needed

Pub Med search on “beryllium disease”

1998-2002 - 120 articles, mostly on
sarcoidosis

2003-2008 – 186 articles

Areas of Research

Health Effects

Exposure Assessment

Control Technology

Basic Research

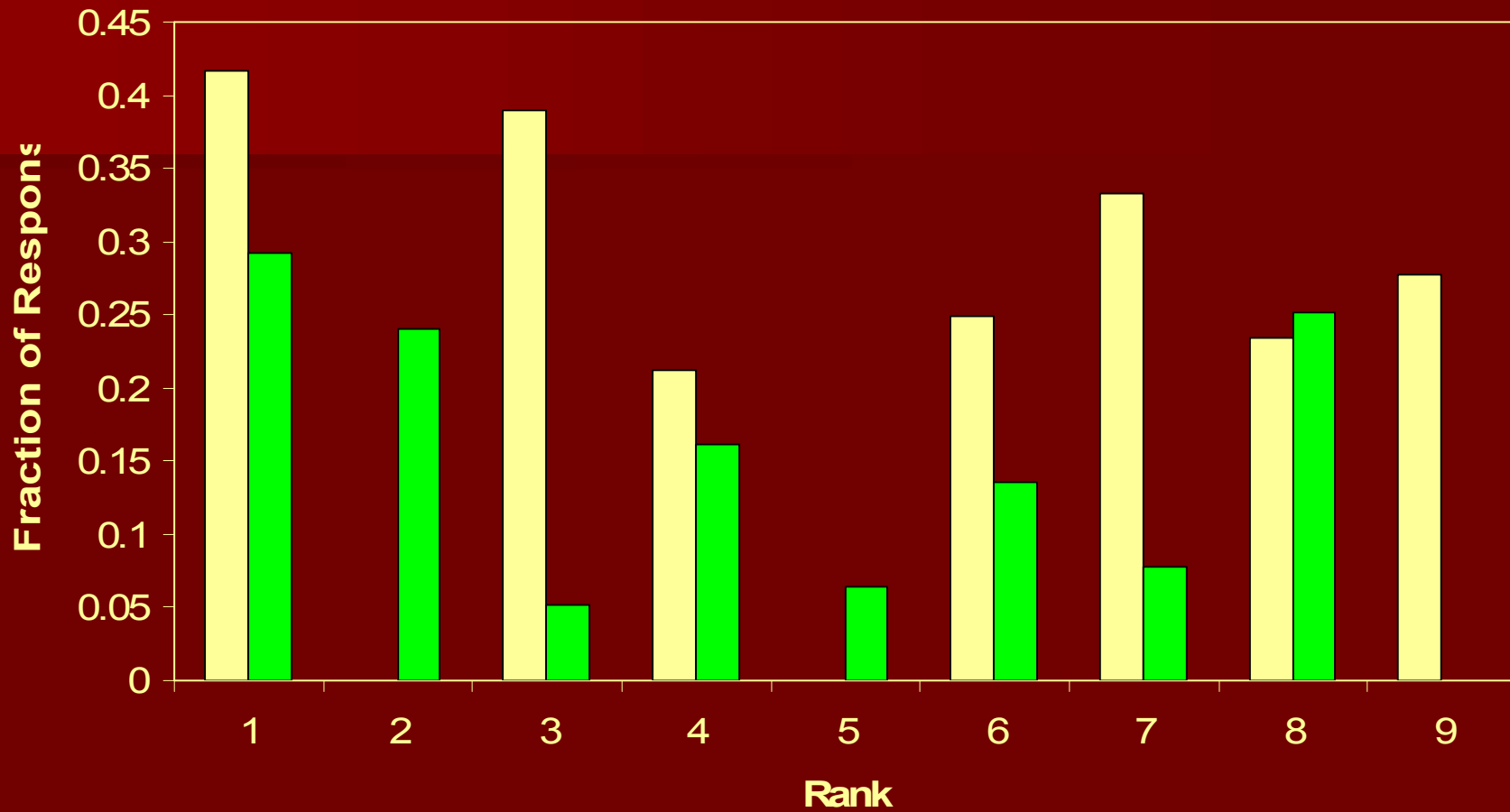
Methods

- 4 Surveys to cover 4 areas
- Survey Monkey.com
- 23-27 respondents/questionnaire
- 63 BHSC members
- Weighted Results / N/A
- Call for New Questions

Health Effects

TOPIC	Score	Priority	Number	Published Results
1. Develop and validate improved screening and diagnostic tests, including the identification of genetic factors that relate to risk	3.04	1	24	2,3
8. Identify opportunities for therapeutic interventions (pre-CBD) or specific therapies for CBD.	3.42	2	24	4,5,6
3. Characterize and determine the health significance of the physiochemical properties of beryllium. Determine the bioavailability of beryllium at different locations in the body; the health impacts at those locations and the impact on remote organ systems.	3.71	3	24	7, 8
4. Establish Standard clinical definitions and protocols for determining sensitization and disease.	3.86	4	24	ATS
2. Define the natural history of beryllium disease.	4.42	5	24	9
5. Develop in-vivo and in-vitro technologies for detecting beryllium in tissue.	5.04	6	24	10
6. Develop and test an animal that models human CBD by contracting the disease after exposure to beryllium.	5.13	7	24	NYU
7. Develop a human cell line that responds to beryllium.	5.46	8	24	

Variability of Responses



Develop and validate improved screening and diagnostic tests, including the identification of genetic factors that relate to risk

■ Priority 1 ■ Priority 2

Identify opportunities for therapeutic interventions (pre-CBD) or specific therapies for CBD.

Basic Research

TOPIC	Score	Priority	Number Responding	Published Results
2. Determine the dose-response relationship for beryllium sensitization and disease for different exposure parameters, i.e. mass, number, size fraction, chemical for,particle surface area	2.74	1	27	11
7. Determine the natural history of beryllium disease: sensitization to disease; different rates of progression; workers and public; include non-occupational exposure; risk factors e.g. genetics, underlying disease, gender, age, smoking.	3.00	2	27	12
4. Develop sampling methods to characterize and identify biomarkers of exposure such as molecules in serum that indicate exposure, sensitivity, disease.	3.54	3	27	13
1. Determine effective means for communicating beryllium risk	3.85	4	27	
5. Develop a nationwide beryllium registry for all sensitized and CBD individuals.	4.04	5	27	DOE
3. Determine the prevalence of sensitization and disease in public. Include support personnel around beryllium operations. Consider smoking. Include natural and non-occupational exposures.	4.15	6	27	14
6. Develop a nationwide tissue repository (library) of samples obtained from beryllium sensitized and diseased patients.	5.32	7	27	DOE

Control Technology

TOPIC	Score	Priority	Number Responding	Published Results
3. Develop improved engineering and administrative controls for maintenance, construction or demolition activities	1.61	1	23	15
1. Develop a coating technology to mitigate particulate beryllium release from surfaces	2.13	2	23	
2. Establish a standard reference material for beryllium alloy particulate	2.22	3	23	16,17

Exposure Assessment

TOPIC	Score	Priority	Number Responding	Published Results
1. Develop a sampling method that characterizes beryllium particle exposure by mass, number, size fraction, chemical form and surface area	3.96	1	24	
8. Determine the types and levels of beryllium exposure that are generated by different types of activities.	4.00	2	24	18, 19, 20, 21, 22, 23
3. Develop different methods to better characterize exposure risk of beryllium exposure (e.g. real time analysis of beryllium)	5.00	3	24	
4. Develop sampling methods to characterize fine and ultrafine beryllium particulate exposure	5.21	4	24	24
6. Develop methods for quantifying skin and mucous membrane exposure	5.42	5	24	25
9. Determine which exposure parameters correlate with each other at different times and workplaces	5.52	6	24	
2. Identify or develop a high flow personal sampling pump	5.79	7	24	
5. Develop standardized and validated sampling methods for surface sampling of uncommon, rough or porous surfaces	5.79	8	24	26
7. Develop real time beryllium particle counter	6.17	9	24	

New Questions

EXPOSURE ASSESSMENT

- 1 Develop better safe work habits and ways to prevent Be exposures
- 2 Speciation of beryllium found in diseased persons so that comparisons can be made from what is found in the workplace that might be causing disease
- 3 Sensitization versus disease and correlated particle sizes with respect to airborne fractions.

HEALTH EFFECTS

- 1 Publish a definitive list of illnesses NOT related to beryllium exposure
- 2 Develop a plan to help people with BeS and CBD, find out what these affected workers needs are.
- 3 Develop guidance or criteria for the AMA so that physicians correctly diagnose airway disease

CONTROL

- 1 Develop a realistic criteria for sampling and analysis people and labs. The requirement for labs to be AIHA certified is not realistic. Labs that are not certified can and do good work whereas not all of the AIHA labs do good work.
- 2 Develop particle sizing profiles from different work environments to link to sampling programs (one size does not fit all). It is priority #1 for demonstrating adequate controls and proving it.

BASIC RESEARCH

- 1 Develop risk communication plan that involves exposed workers in defining research priorities, future strategies

Conclusions

- None of the items were overwhelmingly judged “not applicable”
- Major published issues “BeLPT” and “genetics”
- No formal program for funding
- Ease of polling makes more frequent dissemination possible